Dialysis

Vascular Access

19. Preventing Staphylococcal-related Bacteraemia and Catheter Sepsis

CARI Guidelines

a. Chorhexidine or Mupirocin ointment and/or povidone iodine ointment, should be used on catheter exit site to reduce local and systemic infection rates (level A evidence).

b. Eradication of nasal staph carriage may also reduce staphylococcal bacteraemia/infection rates but requires regular re-treatment (level A evidence).

Practice Tips

CVC catheters are the major risk factor for staphylococcal bacteraemia. Chlorhexidine appears superior to betadine or alcohol for insertion of central venous catheters. Exit site infection rates may relate to inadequate sterility with connections and routine soaking of connections with povidone-iodine is recommended. The catheter should be covered by a dressing however the optimum dressing and frequency of change are undefined. Dry gauze with betadine has been shown to be effective, but transparent dressings are preferred for comfort and aid fixation of the catheter. The exit site should be examined at each dialysis. Access to the lines should be performed after cleaning the caps and ports with betadine or chlorhexidine,using a sterile technique. The catheter should be fixed to avoid unnecessary traction.

What is the evidence?

Sesso 1998. Effectiveness of prophylaxis with mupirocin ointment compared to povidone iodine alone
Subjects - 136 patients needing venous access.
Methods - 2% calcium mupirocin plus povidone iodine (69 patients) vs 10% povidine iodine alone (67 patients.)
Quality - Allocation concealment, Unclear blinding of outcome assessment, Intention to treat analysis, 100% follow up.
Results - Median duration of catheter use was significantly greater in the treatment group. Patients in the treated group had significantly lower rate of S aureus isolation from the pericatheter skin and surface as well as lower rate of infection (4.3% vs 23.9%. S aureus -associated bacteremia was also significantly lower in the treated group). Hazard ratio of developing S aureus bacteremia was 7.2 times greater in patients not receiving therapy.
Conclusion - Mupirocin significantly reduces the risk of S aureus skin and catheter colonization, exit site infection, and bacteremia in hemodialysis patients.

Levin 1991. Effectiveness of the use of topical povidone-iodine ointment in reducing the incidence of subclavian catheter related infection
Subjects - 129 acute or chronic renal failure patients requiring subclavian catheters (SCC) for hemodialysis access
Methods - Povidine-iodine ointment (63 patients) vs sterile gauze alone (66).
Quality - Allocation concealment, unclear blinding of outcome assessment, No intention to treat analysis, 99% follow up
Results - Relative risk reduction (RRR) in exit-site infection attributable to the treatment was 72%. RRR in tip colonization attributable to the treatment was 52%; incidence of septicemia, 78%. S

aureus nasal carriers were at a threefold higher risk of SCC related septicemia. There were no adverse effects from the treatment.
Conclusion - Topical povidone-iodine ointment to temporary hemodialysis catheter exit sites is effective in reducing SCC related infections.

Fong IW. Prevention of haemodialysis and peritoneal dialysis catheter related infection by topical povidone-iodine. Postgrad Med J 1993; 69 suppl 3: S15-17. Randomised controlled trial of 129 patients HD patients controlling for nasal staph carriage. 75% risk reduction, maximal in nasal staph carriers.

Boelaert JR, Van Landuyt HW, Goddard CA et al. Nasal mupirocin ointment decreases the incidence of staphylococcus aureus bacteraemias in haemodialysis patients. Nephrol Dial Transplant 1993; 8: 235-239. 2 year Prospective examination with historical control group showing 75% reduction in bacteraemia with once or thrice weekly mupirocin regimes with one isolate of a mupirocin-resistant staph.

Maki, DG, Ringer M, Alvarado C. Prospective randomised trial of povidone-iodine, alcohol and chlorhexidine for the prevention of infection associated with central and arterial catheters. Lancet 1991; 338:339-343. (A prospective randomised trial of 668 patients showing the lowest rate of bacterial colonisation and bacteraemia in the 2% chorhexidine arm).

What do the other guidelines say?

DOQI: No guidelines available

BRA: No guidelines available

CSN: Include instruction on infection control measures for all hemodialysis access sites in staff and patient education (opinion).

Use clean technique for needle cannulation for all cannulation procedures (see below).

Ensure that only trained dialysis staff change hemodialysis catheter dressings and manipulate catheters that access the patient's bloodstream (evidence: level III).

Examine the catheter exit site at each hemodialysis treatment for signs of infection. Change catheter exit site dressings at each hemodialysis treatment. Use dry gauze dressings and povidone iodine or mupirocin ointment at the catheter exit site whenever possible (evidence: level II).

Minimize contamination when manipulating a catheter and accessing the patientís bloodstream (opinion).

Implementation and Audit

Catheter infection rates should be recorded and audited

Suggestions for Future Research

RCT of exit site mupirocin vs betadine and nasal mupirocin

RCT of different dressings and frequency of change